US010991294B2

(12) **United States Patent**
He

(10) **Patent No.: US 10,991,294 B2**
(45) **Date of Patent: *Apr. 27, 2021**

(54) **DRIVING METHOD OF DISPLAY PANEL AND DISPLAY APPARATUS FOR CONTROLLING IMAGE FRAMES AND SUB-PIXELS**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **16/646,205**

(22) PCT Filed: **Aug. 15, 2018**

(86) PCT No.: **PCT/CN2018/100596**
§ 371 (c)(1),
(2) Date: **Mar. 11, 2020**

(87) PCT Pub. No.: **WO2019/047690**
PCT Pub. Date: **Mar. 14, 2019**

(65) **Prior Publication Data**

US 2020/0273414 A1 Aug. 27, 2020

(30) **Foreign Application Priority Data**

Sep. 11, 2017 (CN) 201710812894.8

(51) **Int. Cl.**
G09G 3/20 (2006.01)
G09G 3/36 (2006.01)

(52) **U.S. Cl.**
CPC ***G09G 3/2018*** (2013.01); ***G09G 3/2074*** (2013.01); ***G09G 3/3607*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC .. G09G 3/2018; G09G 3/2074; G09G 3/3607; G09G 2320/0233;
(Continued)

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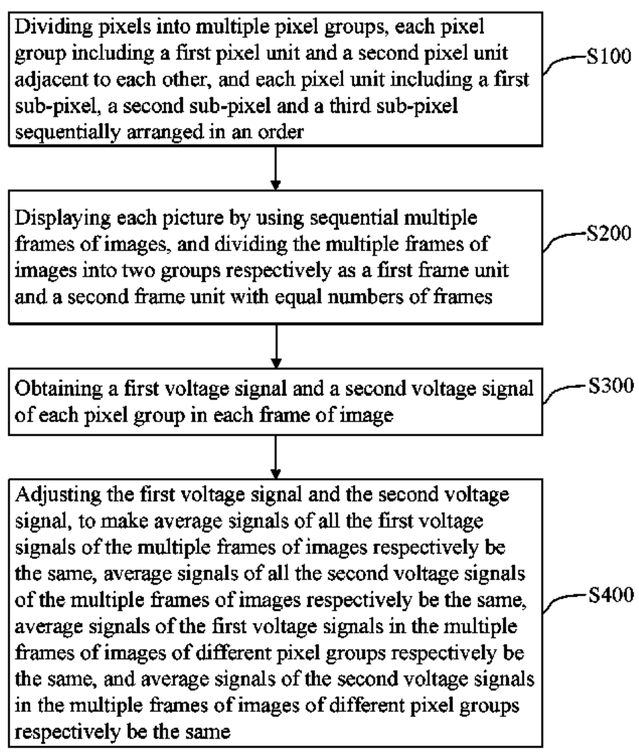
(57) **ABSTRACT**

A driving method of a display panel and a display apparatus are provided. The method includes: dividing pixels into multiple pixel groups; displaying each picture by sequential multiple frames of images and dividing the frames of images into two groups respectively as first and second frame units with equal numbers of frames; obtaining first and second voltage signals of each pixel group in each frame of image; and adjusting the first and second voltage signals to make average signals of all first voltage signals of respective frames of images be the same, average signals of all second voltage signals of respective frames of images be the same, average signals of first voltage signals in the frames of images of different pixel groups respectively be the same, and average signals of second voltage signals in the frames of images of different pixel groups respectively be the same.

20 Claims, 7 Drawing Sheets



(52) **U.S. Cl.**
CPC *G09G 2320/0233* (2013.01); *G09G 2320/0242* (2013.01); *G09G 2320/0247* (2013.01); *G09G 2340/0435* (2013.01)

(58) **Field of Classification Search**
CPC ... G09G 2320/0242; G09G 2320/0247; G09G 2340/0435
See application file for complete search history.

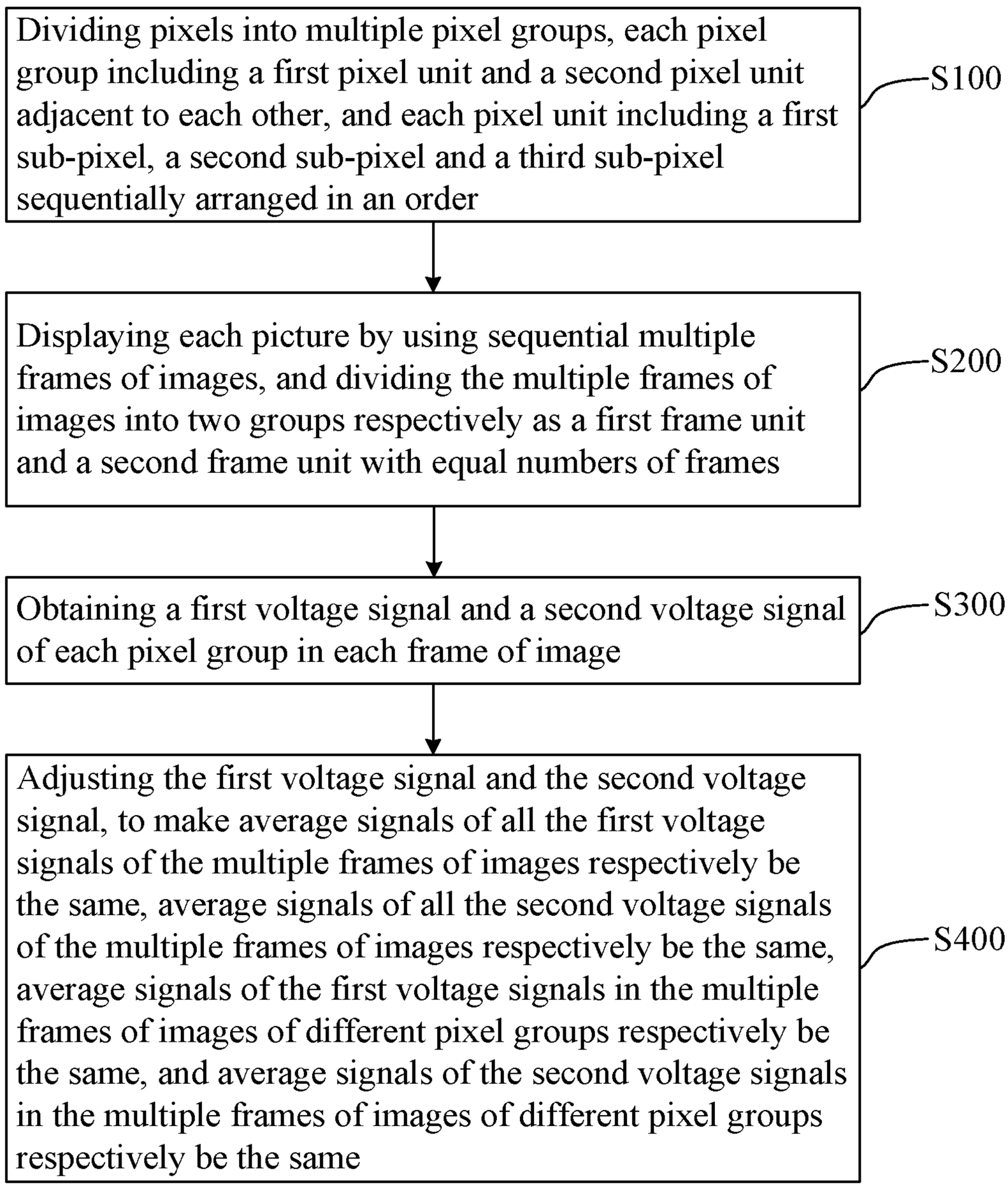

Dividing pixels into multiple pixel groups, each pixel group including a first pixel unit and a second pixel unit adjacent to each other, and each pixel unit including a first sub-pixel, a second sub-pixel and a third sub-pixel sequentially arranged in an order
S100
Displaying each picture by using sequential multiple frames of images, and dividing the multiple frames of images into two groups respectively as a first frame unit and a second frame unit with equal numbers of frames
S200
Obtaining a first voltage signal and a second voltage signal of each pixel group in each frame of image
S300
Adjusting the first voltage signal and the second voltage signal, to make average signals of all the first voltage signals of the multiple frames of images respectively be the same, average signals of all the second voltage signals of the multiple frames of images respectively be the same, average signals of the first voltage signals in the multiple frames of images of different pixel groups respectively be the same, and average signals of the second voltage signals in the multiple frames of images of different pixel groups respectively be the same
S400

FIG. 1

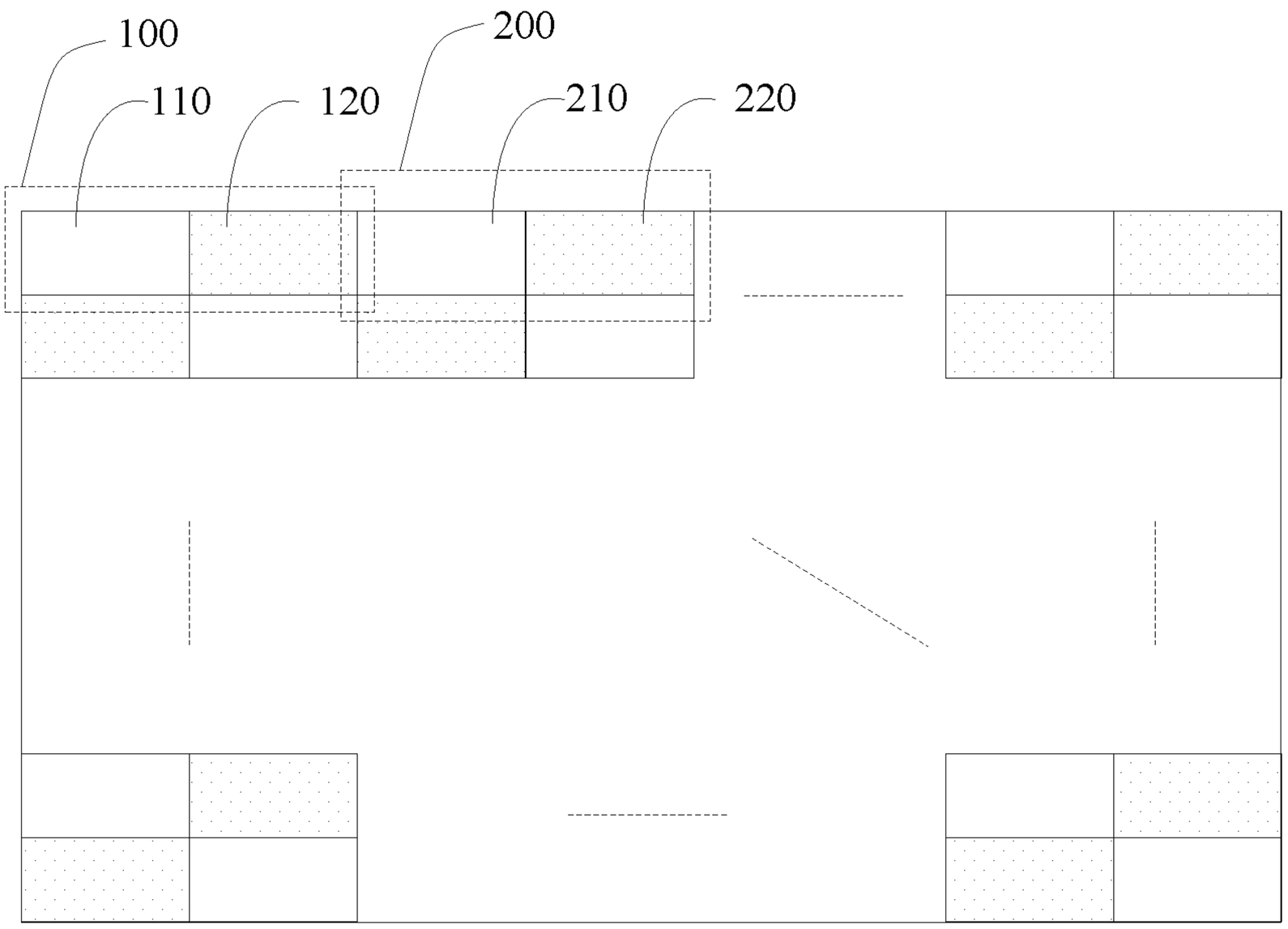


FIG. 2

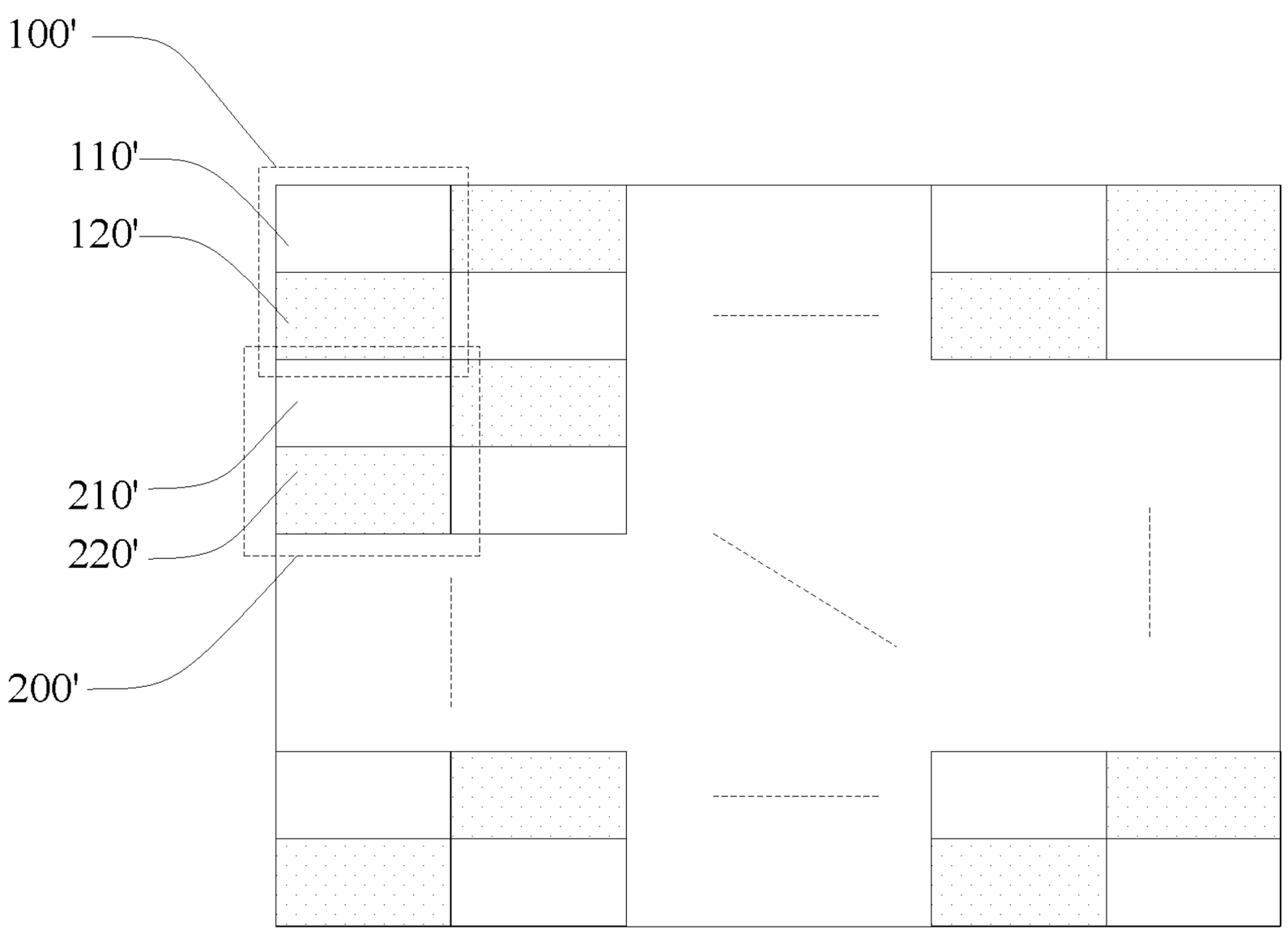


FIG. 3

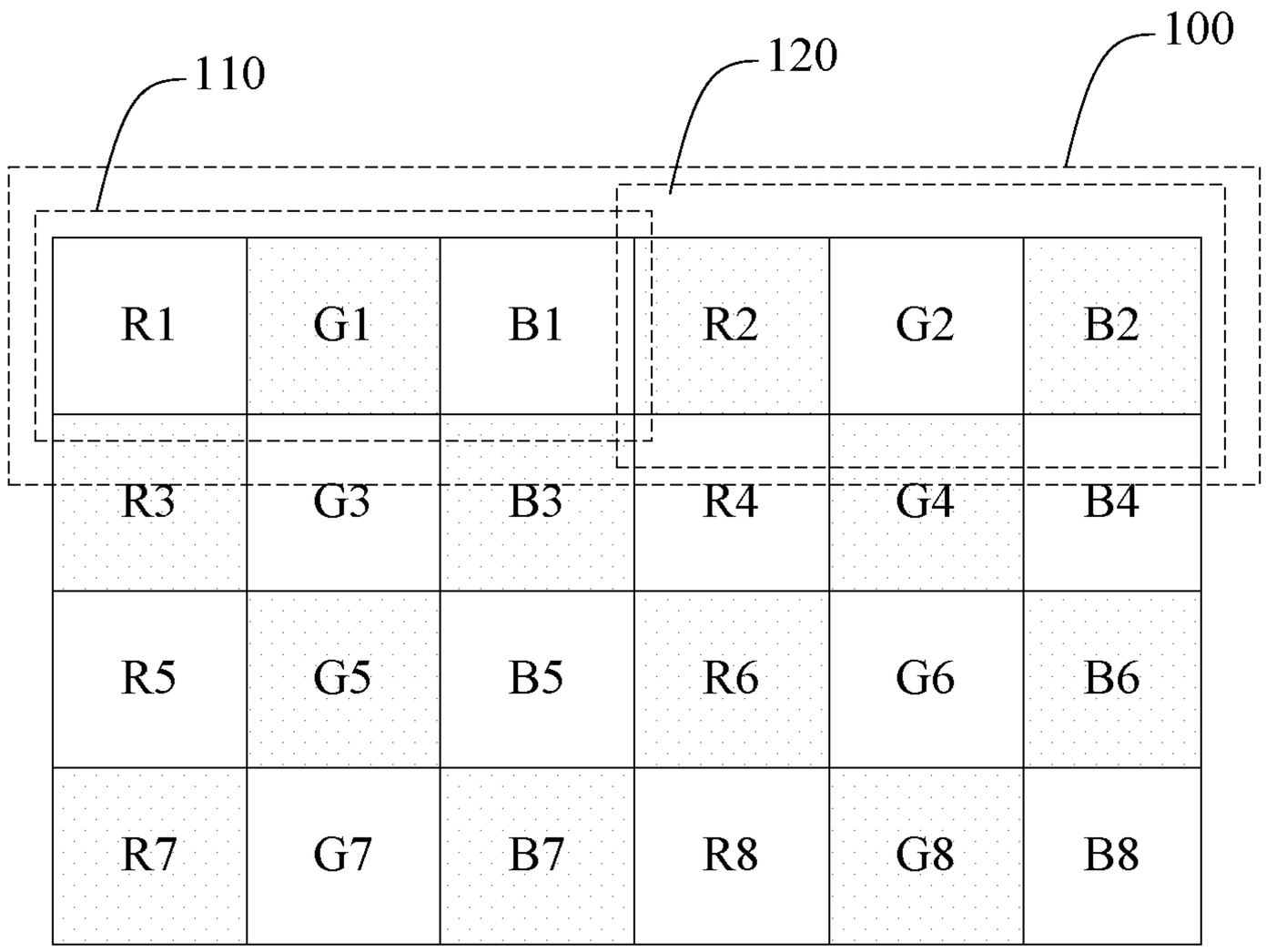


FIG. 4

First frame

A1-128	A2-56
A3-56	A4-124
A5-124	A6-60
A7-56	A8-124

Second frame

A1-124	A2-60
A3-56	A4-124
A5-128	A6-56
A7-56	A8-124

Third frame

A1-124	A2-56
A3-56	A4-128
A5-124	A6-56
A7-60	A8-124

Fourth frame

A1-124	A2-56
A3-60	A4-124
A5-124	A6-56
A7-56	A8-128

Fifth frame

A1-56	A2-128
A3-124	A4-56
A5-60	A6-124
A7-124	A8-56

Sixth frame

A1-60	A2-124
A3-124	A4-56
A5-56	A6-128
A7-124	A8-56

Seventh frame

A1-56	A2-124
A3-128	A4-56
A5-56	A6-124
A7-124	A8-60

Eighth frame

A1-56	A2-124
A3-124	A4-60
A5-56	A6-124
A7-128	A8-56

FIG. 5

First frame

G1-56	G2-128
G3-124	G4-56
G5-60	G6-124
G7-124	G8-56

Second frame

G1-60	G2-124
G3-124	G4-56
G5-56	G6-128
G7-124	G8-56

Third frame

G1-56	G2-124
G3-128	G4-56
G5-56	G6-124
G7-124	G8-60

Fourth frame

G1-56	G2-124
G3-124	G4-60
G5-56	G6-124
G7-128	G8-56

Fifth frame

G1-128	G2-56
G3-56	G4-124
G5-124	G6-60
G7-56	G8-124

Sixth frame

G1-124	G2-60
G3-56	G4-124
G5-128	G6-56
G7-56	G8-124

Seventh frame

G1-124	G2-56
G3-56	G4-128
G5-124	G6-56
G7-60	G8-124

Eighth frame

G1-124	G2-56
G3-60	G4-124
G5-124	G6-56
G7-56	G8-128

FIG. 6

First frame

A1-128	A2-56
A3-60	A4-124
A5-124	A6-60
A7-56	A8-128

Second frame

A1-124	A2-60
A3-56	A4-128
A5-128	A6-56
A7-60	A8-124

Third frame

A1-128	A2-56
A3-60	A4-124
A5-124	A6-60
A7-56	A8-128

Fourth frame

A1-124	A2-60
A3-56	A4-128
A5-128	A6-56
A7-60	A8-124

Fifth frame

A1-56	A2-128
A3-124	A4-60
A5-60	A6-124
A7-128	A8-56

Sixth frame

A1-60	A2-124
A3-128	A4-56
A5-56	A6-128
A7-124	A8-60

Seventh frame

A1-56	A2-128
A3-124	A4-60
A5-60	A6-124
A7-128	A8-56

Eighth frame

A1-60	A2-124
A3-128	A4-56
A5-56	A6-128
A7-124	A8-60

FIG. 7

First frame

A1-128	A2-56
A3-60	A4-124
A5-128	A6-60
A7-60	A8-128

Second frame

A1-128	A2-60
A3-60	A4-128
A5-128	A6-56
A7-60	A8-124

Third frame

A1-128	A2-60
A3-60	A4-128
A5-124	A6-60
A7-56	A8-128

Fourth frame

A1-124	A2-60
A3-56	A4-128
A5-128	A6-60
A7-60	A8-128

Fifth frame

A1-56	A2-128
A3-124	A4-60
A5-60	A6-128
A7-128	A8-60

Sixth frame

A1-60	A2-128
A3-128	A4-60
A5-56	A6-128
A7-124	A8-60

Seventh frame

A1-60	A2-128
A3-128	A4-60
A5-60	A6-124
A7-128	A8-56

Eighth frame

A1-60	A2-124
A3-128	A4-56
A5-60	A6-128
A7-128	A8-60

FIG. 8

First frame

A1-124	A2-56
A3-56	A4-124
A5-124	A6-56
A7-56	A8-124

Second frame

A1-124	A2-56
A3-56	A4-124
A5-124	A6-56
A7-56	A8-124

Third frame

A1-124	A2-56
A3-56	A4-124
A5-124	A6-56
A7-56	A8-124

Fourth frame

A1-124	A2-56
A3-56	A4-124
A5-124	A6-56
A7-56	A8-124

Fifth frame

A1-56	A2-124
A3-124	A4-56
A5-56	A6-124
A7-124	A8-56

Sixth frame

A1-56	A2-124
A3-124	A4-56
A5-56	A6-124
A7-124	A8-56

Seventh frame

A1-56	A2-124
A3-124	A4-56
A5-56	A6-124
A7-124	A8-56

Eighth frame

A1-56	A2-124
A3-124	A4-56
A5-56	A6-124
A7-124	A8-56

FIG. 9

First frame

A1-128	A2-60
A3-60	A4-128
A5-128	A6-60
A7-60	A8-128

Second frame

A1-128	A2-60
A3-60	A4-128
A5-128	A6-60
A7-60	A8-128

Third frame

A1-128	A2-60
A3-60	A4-128
A5-128	A6-60
A7-60	A8-128

Fourth frame

A1-128	A2-60
A3-60	A4-128
A5-128	A6-60
A7-60	A8-128

Fifth frame

A1-60	A2-128
A3-128	A4-60
A5-60	A6-128
A7-128	A8-60

Sixth frame

A1-60	A2-128
A3-128	A4-60
A5-60	A6-128
A7-128	A8-60

Seventh frame

A1-60	A2-128
A3-128	A4-60
A5-60	A6-128
A7-128	A8-60

Eighth frame

A1-60	A2-128
A3-128	A4-60
A5-60	A6-128
A7-128	A8-60

FIG. 10

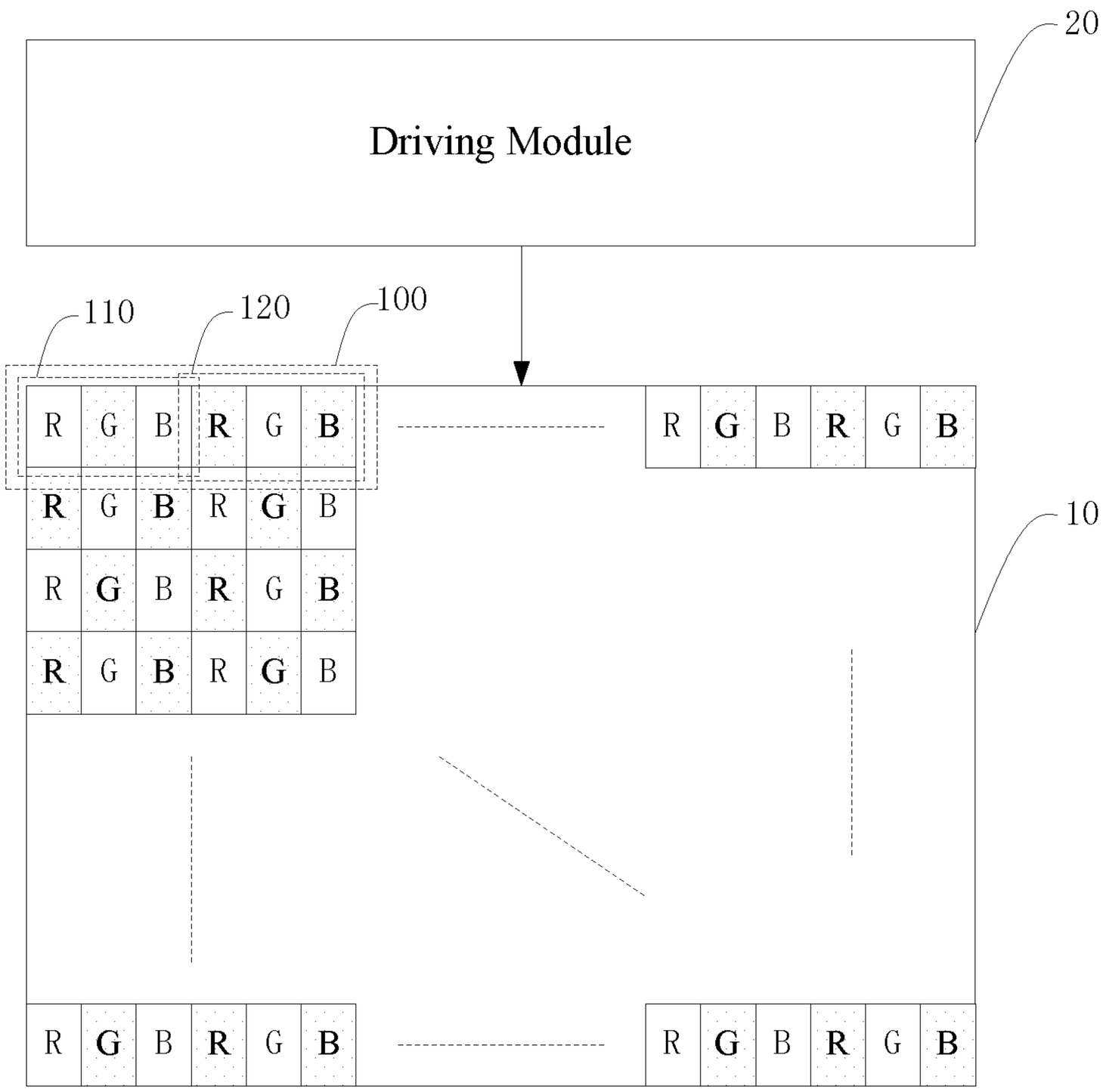


FIG. 11

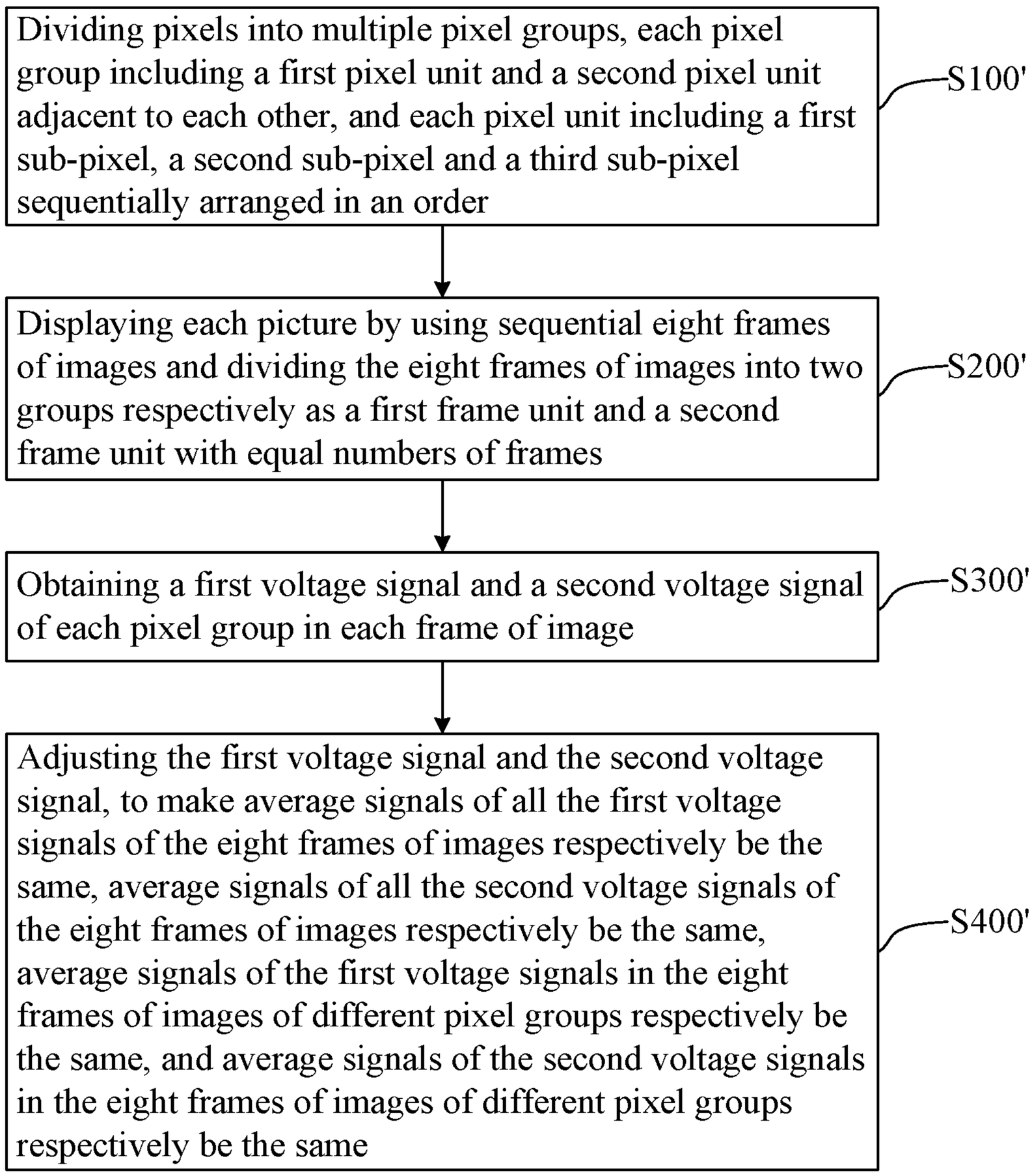

Dividing pixels into multiple pixel groups, each pixel group including a first pixel unit and a second pixel unit adjacent to each other, and each pixel unit including a first sub-pixel, a second sub-pixel and a third sub-pixel sequentially arranged in an order
S100'
Displaying each picture by using sequential eight frames of images and dividing the eight frames of images into two groups respectively as a first frame unit and a second frame unit with equal numbers of frames
S200'
Obtaining a first voltage signal and a second voltage signal of each pixel group in each frame of image
S300'
Adjusting the first voltage signal and the second voltage signal, to make average signals of all the first voltage signals of the eight frames of images respectively be the same, average signals of all the second voltage signals of the eight frames of images respectively be the same, average signals of the first voltage signals in the eight frames of images of different pixel groups respectively be the same, and average signals of the second voltage signals in the eight frames of images of different pixel groups respectively be the same
S400'

FIG. 12

DRIVING METHOD OF DISPLAY PANEL AND DISPLAY APPARATUS FOR CONTROLLING IMAGE FRAMES AND SUB-PIXELS

FIELD OF THE DISCLOSURE

The disclosure relates to the field of display technology, and more particularly to a driving method of a display panel and a display apparatus.

BACKGROUND

An exemplary liquid crystal display technology uses a 6-bit driver IC to realize an 8-bit picture quality resolution rendering, and further uses a FRC (Frame Rate Control) technology to divide two adjacent grayscales into more than two grayscales and display a target display grayscale by multiple frames distributed in quantity, so as to achieve the showing of equivalent brightness perceived by human eyes based on persistence of vision.

However, when displaying a 125th-level luminance signal and a 57th-level luminance signal, because the 6-bit driver IC only can realize 8-bit resolution displays of the 124th-level luminance signal as well as the 128th-level luminance signal and 8-bit resolution displays of the 56th-level luminance signal as well as the 60th-level luminance signal, and therefore it needs multiple frames to distribute for display. If average brightnesses based on the distribution are different, equivalent brightnesses perceived by human eyes would have bright and dark changes, the naked eyes will feel the noticeable flicker phenomenon of unequal brightness, and it will result in poor display quality for display panels.

SUMMARY

Therefore, there is a need of providing a driving method of a display panel and a display apparatus, so as to address the problem of poor display quality of display panels.

In an aspect, a driving method of a display panel includes:

dividing pixels into a plurality of pixel groups, wherein each of the pixel groups includes a first pixel unit and a second pixel unit adjacent to each other, each of the first and second pixel units includes a first sub-pixel, a second sub-pixel and a third sub-pixels sequentially arranged in an order;

displaying each picture by using sequential multiple frames of images and dividing the multiple frames of images into two groups as a first frame unit and a second frame unit with equal numbers of frames of images;

obtaining a first voltage signal and a second voltage signal of each of the pixel groups in each of the multiple frames of images; wherein in the first frame unit, the first voltage signal drives the first sub-pixel and the third sub-pixel of the first pixel unit and the second sub-pixel of the second pixel unit, and the second voltage signal drives the second sub-pixel of the first pixel unit and the first sub-pixel and the third sub-pixel of the second pixel unit; wherein in the second frame unit, the first voltage signal drives the second sub-pixel of the first pixel unit and the first sub-pixel and the third sub-pixel of the second pixel unit, and the second voltage signal drives the first sub-pixel and the third sub-pixel of the first pixel unit and the second sub-pixel of the second pixel unit; and wherein and the first voltage signal is not equal to the second voltage signal; and

adjusting the first voltage signal and the second voltage signal to make average signals of all the first voltage signals of the multiple frames of images respectively be the same, average signals of all the second voltage signals of the multiple frames of images respectively be the same, average signals of the first voltage signals in the multiple frames of images of different ones of the pixel groups respectively be the same, and average signals of the second voltage signals in the multiple frames of images of different ones of the pixel groups respectively be the same.

In an embodiment, the first pixel unit and the second pixel unit in a same row are adjacently disposed.

In an embodiment, in the same row, in the same row, for adjacent two of the pixel groups, the first pixel unit of one pixel group is disposed adjacent to the second pixel unit of the other one pixel group.

In an embodiment, the first pixel unit and the second pixel unit in a same column are adjacently disposed.

In an embodiment, in the same column, for adjacent two of the pixel groups, the first pixel unit of one pixel group is disposed adjacent to the second pixel unit of the other one pixel group.

In an embodiment, the multiple frames of images are eight frames of images.

In an embodiment, the eight frames of images sequentially are a first frame of image, a second frame of image, a third frame of image, a fourth frame of image, a fifth frame of image, a sixth frame of image, a seventh frame of image and an eighth frame of image.

In an embodiment, the first voltage signal is higher than the second voltage signal.

In an embodiment, each the pixel unit includes three color sub-pixels.

In an embodiment, the three color sub-pixels respectively are a red sub-pixel, a green sub-pixel and a blue sub-pixel.

In an embodiment, the first sub-pixel, the second sub-pixel and the third sub-pixel respectively are a red sub-pixel, a green sub-pixel and a blue sub-pixel.

In an embodiment, driving voltage polarities for adjacent sub-pixels are opposite to each other.

In an embodiment, the first voltage signal and the second voltage signal respectively are corresponding to different signal values.

In an embodiment, the signal values corresponding to the first voltage signal are 124 and 128, and the signal values corresponding to the second voltage signal are 56 and 60.

In an embodiment, the sub-pixels driven by the first voltage signal and the second voltage signal have different signal values.

In an embodiment, the first voltage signal and the second voltage signal alternately drive each sub-pixel.

In another aspect, a display apparatus includes:

a display panel, wherein the display panel is divided into a plurality of pixel groups, each of the pixel groups includes a first pixel unit and a second pixel unit adjacent to each other, and each of the first and second pixel units includes a first sub-pixel, a second sub-pixel and a third sub-pixel sequentially arranged in an order; and

a driving module, configured to make each picture be displayed by using sequential multiple frames of images and divide the multiple frames of images into two groups respectively as a first frame unit and a second frame unit with equal numbers of frames of images, and further configured to obtain a first voltage signal and a second voltage signal of each of the pixel groups in each of the multiple frames of images and adjust the first voltage signal and the second voltage signal to make average signals of all the first voltage signals of the multiple frames of images respectively be the same, average signals of all the second voltage signals

of the multiple frames of images respectively be the same, average signals of the first voltage signals in the multiple frames of images of different pixel groups respectively be the same, and average signals of the second voltage signals in the multiple frames of images of different pixel groups respectively be the same; wherein in the first frame unit, the first voltage signal is configured to drive the first sub-pixel and the third sub-pixel of the first pixel unit and the second sub-pixel of the second pixel unit, and the second voltage signal is configured to drive the second sub-pixel of the first pixel unit and the first sub-pixel and the third sub-pixel of the second pixel unit; wherein in the second frame unit, the first voltage signal is configured to drive the second sub-pixel of the first pixel unit and the first sub-pixel and the third sub-pixel of the second pixel unit, and the second voltage signal is configured to drive the first sub-pixel and the third sub-pixel of the first pixel unit and the second sub-pixel of the second pixel unit; and wherein the first voltage signal is not equal to the second voltage signal.

In an embodiment, in the display panel, for adjacent two pixel groups, the first pixel unit of one pixel group is disposed adjacent to the second pixel unit of the other one pixel group.

In an embodiment, the adjacent two pixel groups are two pixel groups adjacent to each other in a row direction or in a column direction.

In still another aspect, a driving method of a display panel includes:

dividing pixels into a plurality of pixel groups, wherein each of the pixel groups includes a first pixel unit and a second pixel unit adjacent to each other, each the pixel unit includes a first sub-pixel, a second sub-pixel and a third sub-pixels sequentially arranged in an order;

displaying each picture by using sequential eight frames of images and dividing the eight frames of images into two groups respectively as a first frame unit and a second frame unit with equal numbers of frames of images;

obtaining a first voltage signal and a second voltage signal of each of the pixel groups in each of the multiple frames of images; wherein in the first frame unit, the first voltage signal drives the first sub-pixel and the third sub-pixel of the first pixel unit and the second sub-pixel of the second pixel unit, and the second voltage signal drives the second sub-pixel of the first pixel unit and the first sub-pixel and the third sub-pixel of the second pixel unit; wherein in the second frame unit, the first voltage signal drives the second sub-pixel of the first pixel unit and the first sub-pixel and the third sub-pixel of the second pixel unit, and the second voltage signal drives the first sub-pixel and the third sub-pixel of the first pixel unit and the second sub-pixel of the second pixel unit; and wherein and the first voltage signal is higher than the second voltage signal; and

adjusting the first voltage signal and the second voltage signal to make average signals of all the first voltage signals of the eight frames of images respectively be the same, average signals of all the second voltage signals of the eight frames of images respectively be the same, average signals of the first voltage signals in the eight frames of images of different ones of the pixel groups respectively be the same, and average signals of the second voltage signals in the eight frames of images of different ones of the pixel groups respectively be the same.

The above driving method of a display panel and display apparatus use a high and low voltages pixel driving manner of multi-frame period, make the same sub-pixel in the same pixel unit be driven by high and low voltages in the multi-frame period so as to improve the color shift problem in timings for the sub-pixels in the same pixel unit, and make the average signals of all high voltage signals of the respective frames of images be the same, the average signals of all the low voltage signals of the respective frames of images be the same, the average signals of the high voltage signals in the multiple frames of images for different pixel groups respectively be the same and the average signals of low voltage signals in the multiple frames of images for different pixel groups respectively be the same, so as to solve the problem of low frequency brightness flicker. Therefore, the above driving method not only improves the color shift problem in timings for the sub-pixels in the same pixel unit but also solves the problem of low frequency brightness flicker, and thus the display quality of the display panel is improved consequently.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a flow chart of a driving method of a display panel according to an embodiment.

FIG. **2** is a schematic view of an arrangement of pixel groups according to an embodiment.

FIG. **3** is a schematic view of an arrangement of pixel groups according to another embodiment.

FIG. **4** is a schematic view of an arrangement of sub-pixels according to an embodiment.

FIG. **5** is a schematic diagram of voltage signals of sub-pixels according to another embodiment.

FIG. **6** is a schematic diagram of voltage signals of sub-pixels according to another embodiment.

FIG. **7** is a schematic diagram of voltage signals of sub-pixels according to another embodiment.

FIG. **8** is a schematic diagram of voltage signals of sub-pixels according to another embodiment.

FIG. **9** is a schematic diagram of voltage signals of sub-pixels according to another embodiment.

FIG. **10** is a schematic diagram of voltage signals of sub-pixels according to another embodiment.

FIG. **11** is a schematic view of a display apparatus according to an embodiment.

FIG. **12** is a flow chart of a driving method of a display panel according to another embodiment.

DETAILED DESCRIPTION OF EMBODIMENTS

In order to facilitate the understandings of the disclosure, the disclosure will be described below more fully with reference to accompanying drawings. Preferred embodiments of the disclosure are given in the accompanying drawings. However, the disclosure may be embodied in many different forms and is not limited to the embodiments described herein. Rather, the purposes of providing these embodiments are to make the understanding of the described content of the disclosure be more thorough and comprehensive.

Unless otherwise defined, all technical and scientific terms used herein have same meanings as commonly understood by one skilled in the art to which the disclosure pertains. The terms used herein in the specification of the disclosure are merely for the purpose of describing specific embodiments and are not intended to be limiting of the disclosure. The term "and/or" as used herein includes any and all combinations of one or more of the associated listed items.

FIG. **1** is a flow chart of a driving method of a display panel according to an embodiment. The driving method includes the following content associated with steps.

Step S**100**: dividing pixels into multiple pixel groups, each pixel group including a first pixel unit and a second pixel unit adjacent to each other, and each pixel unit including a first sub-pixel, a second sub-pixel and a third sub-pixel sequentially arranged in an order.

In particular, each pixel unit includes three color sub-pixels respectively being a red sub-pixel, a green sub-pixel and a blue sub-pixel, and driving voltage polarities for adjacent sub-pixels are opposite to each other.

Step S**200**: displaying each picture by using sequential multiple frames of images and dividing the multiple frames of images into two groups respectively as a first frame unit and a second frame unit with equal numbers of frames of images.

In particular, the multiple frames of images are eight frames of images sequentially being a first frame of image, a second frame of image, a third frame of image, a fourth frame of image, a fifth frame of image, a sixth frame of image, a seventh frame of image and an eighth frame of image.

Moreover, the first frame unit and the second frame unit each include four frames of images. The four frames of images in the first frame unit are adjacent to the four frames of images in the second frame unit; or, the four frames of images in the first frame unit and the four frames of images in the second frame unit are arbitrarily arranged in timing sequence. That is, display orders of the eight frames of images are arbitrary.

Step S**300**: obtaining a first voltage signal and a second voltage signal of each pixel group in each frame of image. In particular, in the first frame unit, the first voltage signal is configured (i.e., structured and arranged) to drive the first sub-pixel and the third sub-pixel of the first pixel unit as well as the second sub-pixel of the second pixel unit, and the second voltage signal is configured to drive the second sub-pixel of the first pixel unit as well as the first sub-pixel and the third sub-pixel of the second pixel unit. In the second frame unit, the first voltage signal is configured to drive the second sub-pixel of the first pixel unit as well as the first sub-pixel and the third sub-pixel of the second pixel unit, the second voltage signal is configured to drive the first sub-pixel and the third sub-pixel of the first pixel unit as well as the second sub-pixel of the second pixel unit. The first voltage signal is not equal to the second voltage signal.

In a concrete embodiment, the first sub-pixel is a red sub-pixel (R), the second sub-pixel is a green sub-pixel (G), and the third sub-pixel is a blue sub-pixel (B). Moreover, the first sub-pixel, the second sub-pixel and the third sub-pixel are sequentially arranged in an order. It should be understood, if the red sub-pixel (R), the green sub-pixel (G) and the blue sub-pixel (B) of a same pixel unit have the first voltage signal (high voltage signal) in the first frame unit (may be any four frames of images in the first through eighth frames of images), corresponding sub-pixels have the second voltage signal (low voltage signal) in the second frame unit (i.e., remaining four frames of images except for the four frames of images in the first frame unit); if a driving signal in the first frame unit for the red sub-pixel (R), the green sub-pixel (G) and the blue sub-pixel (B) of a same pixel unit is the second voltage signal (low voltage signal), the driving signal in the second frame unit the first voltage signal (high voltage signal); that is, the same sub-pixel is alternately driven by high and low voltage signals respectively in the first frame unit and the second frame unit.

In a concrete embodiment, the first voltage signal is higher than the second voltage signal, that is, the first voltage signal is a high voltage signal and the second voltage signal is a low voltage signal.

Moreover, the first voltage signal and the second voltage signal are respectively corresponding to different signal values. For example, the signal values corresponding to the first voltage signal are 124 and 128, and the signal values corresponding to the second voltage signal are 56 and 60. Therefore, the sub-pixels driven by the first voltage signal and the second voltage signal may have different signal values correspondingly.

Step S**400**: adjusting the first voltage signal and the second voltage signal, to make average signals of all the first voltage signals of the multiple frames of images respectively be the same, average signals of all the second voltage signals of the multiple frames of images respectively be the same, average signals-of the first voltage signals in the multiple frames of images of different pixel groups respectively be the same, and average signals of the second voltage signals in the multiple frames of images of different pixel groups respectively be the same.

In the driving method of a display panel provided by the above embodiment, by using a high and low voltage pixel driving manner of multi-frame period, sub-pixels of the same pixel unit are driven by high and low voltages in the multi-frame period, an average signal of all the high voltage signals of each frame of image is the same as the average signal of all the high voltage signals of any one of the other frames of images, an average signal of all the low voltage signals of each frame of image is same as the average signal of all the low Voltage signals of any one of the other frames of images, an average signal of the high voltage signals in the multiple frames of images of each of different pixel groups is the same as the average signal of the high voltage signals in the multiple frames of images of any one of the others of the different pixel groups, and an average signal of the low voltage signals in the multiple frames of images of each of different pixel groups is the same as the average signal of the low voltage signals in the multiple frames of images of any one of the others of the different pixel groups. As a result, the above driving method not only solves the problem of low frequency brightness flicker, but also improves the problem of color shift in timings for sub-pixels in the same pixel unit, and therefore the display quality of the display panel is increased.

In an exemplary embodiment, as shown in FIG. **2**, the first pixel unit **110** and the second pixel unit **120** associated with the step S**100** are adjacently disposed in a same row.

Moreover, in the same row, for adjacent two pixel groups, the first pixel unit **210** in one pixel group **200** and the second pixel unit **120** in the other one pixel group **100** are disposed adjacent with each other.

It should be understood that, an arrangement manner of the first pixel unit **110** and the second pixel unit **120** in the pixel group **100** is not limited to the above embodiment, and may be another arrangement manner as shown in FIG. **3** instead. That is, the first pixel unit **110'** and the second pixel unit **120'** are adjacently disposed in a same column.

Moreover, in the same column, as to adjacent two pixel groups, the first pixel unit **210'** of one pixel group **200'** and the second pixel unit **120'** of the other one pixel group **100'** are disposed adjacent to each other.

In the above embodiment, each pixel unit for example includes three color sub-pixels respectively being a red

sub-pixel, a green sub-pixel and a blue sub-pixel, and driving voltage polarities for adjacent sub-pixels are opposite to each other.

A 6-bit driver IC being used for achieving an 8-bit resolution will be taken as an example to describe the driving method of a display panel provided by the above embodiment below.

Because the 6-bit driver IC can only display 64 levels of grayscales while the 8-bit display effect requires 256 levels of grayscales, and therefore a FRC (Frame Rate Control) technology may be used to make each picture be displayed by sequential multiple frames of images. Based on the visual inertia of the human eye, by suitably controlling a frame rate and grayscale signals of adjacent frames, a 6-bit panel may exhibit an 8-bit display effect.

For example, by controlling a frame rate and using eight frames as a period to display one picture, the 6-bit driver IC can achieve high voltage signals of 124 and 128 as well as low voltage signals of 56 and 60. In order to achieve a combination of a high voltage signal of 125 and a low voltage signal of 57, spatial and temporal distributions of the high voltage signals of 124 and 128 are required to achieve the high voltage signal of 125, spatial and temporal distributions of the low voltage signals of 56 and 60 are required to achieve the low voltage signal of 57.

The frame rate control is a method of realizing a target grayscale display by a color mixing manner based on the visual inertia of human eyes. The color mixing manners may be classified into spatial color mixing and temporal color mixing, and in order to achieve better display effect, both of the two color mixing manner usually are used simultaneously.

In an exemplary embodiment, as shown in FIG. **4**, an implementation manner of the step **100** includes the following content. In particular, for each frame of display image, four pixel groups are used as one display unit, the four pixel groups are longitudinally arranged (i.e., arranged along a longitudinal direction), each pixel group includes a first pixel unit and a second pixel unit, the first pixel units and the second pixel units in adjacent pixel groups are alternately arranged (i.e., in the adjacent pixel groups, the first pixel unit of one pixel group is adjacent to the second pixel unit of the other one pixel group). Each pixel unit includes a red sub-pixel (R), a green sub-pixel (G) and a blue sub-pixel (B) sequentially arranged in an order; the red sub-pixel (R) and the blue sub-pixel (B) of the first pixel unit as well as the green sub-pixel (G) of the second pixel unit use a first voltage signal (high voltage signal) to be driven, the green sub-pixel (G) of the first pixel unit as well as the red sub-pixel (R) and the blue sub-pixel (B) of the second pixel unit use a second voltage signal (low voltage signal) to be driven. For example, the first pixel group **100** includes the first pixel unit **110** and the second pixel unit **120**, the first pixel unit **110** includes the red sub-pixel (R**1**), the green sub-pixel (G**1**) and the blue sub-pixel (B**1**) sequentially arranged in an order, the second pixel unit **120** includes the red sub-pixel (R**2**), the green sub-pixel (G**2**) and the blue sub-pixel (B**2**) sequentially arranged in an order. The red sub-pixel (R**1**) and the blue sub-pixel (B**1**) of the first pixel unit **110** as well as the green sub-pixel (G**2**) of the second pixel unit **120** use the first voltage signal (high voltage signal) to be driven, the green sub-pixel (G**1**) of the first pixel unit **110** as well as the red sub-pixel (R**2**) and the blue sub-pixel (B**2**) of the second pixel unit **120** use the second voltage signal (low voltage signal) to be driven. Other three pixel groups are similar to the first pixel group **100**, and thus will be not repeated herein. Therefore, the high voltage signal and the low voltage signal in the figure alternately drive each sub-pixel.

In a concrete embodiment, the multiple frames of images in the step S**200** is eight frames of images.

In a concrete embodiment, as shown in FIG. **5**, an implementation manner of the step S**300** includes the following content. In particular, eight frames are taken as one display period. In the figure, A**1**-**128** represents a voltage signal of a sub-pixel A**1** is 128, and A**2**-**56** represents a voltage signal of a sub-pixel A**2** is 56. That is, the sub-pixel A**1** is the red sub-pixel (R**1**) or the blue sub-pixel (B**1**) of the first pixel unit **110** in FIG. **4** and uses the first voltage signal (high voltage signal) to be driven; and the sub-pixel A**2** is the red sub-pixel (R**2**) or the blue sub-pixel (B**2**) of the second pixel unit **120** and uses the second voltage signal (low voltage signal) to be driven. It should be understood that, the sub-pixel A**1** and the sub-pixel A**2** satisfy a condition of having the same color. According to the above naming rule, it can be found that A**1**, A**2**, A**3**, A**4**, A**5**, A**6**, A**7** and A**8** are sub-pixels with the same color (red sub-pixels or blue sub-pixels), and the sub-pixels A**1** and A**2**, the sub-pixels A**3** and A**4**, the sub-pixels A**5** and A**6**, and the sub-pixels A**7** and A**8** belong to different pixel groups. It should be understood that the sub-pixels A**1**, A**4**, A**5** and A**8** respectively are the first sub-pixels or the third sub-pixels in the first pixel units of different pixel groups, use the first voltage signals (high voltage signals) to be driven in the preceding four frames and use the second voltage signals (low voltage signals) to be driven in the succeeding four frames. The sub-pixels A**2**, A**3**, A**6** and A**7** respectively are the first sub-pixels or the third sub-pixels in the second pixel units of different pixel groups, use the second voltage signals (low voltage signals) to be driven in the preceding four frames and use the first voltage signals (high voltage signals) to be driven in the succeeding four frames.

In a concrete embodiment, an implementation manner of the step S**400** includes the following content. In particular, as seen from FIG. **5**, in a first frame, the first voltage signals for the sub-pixels A**1**, A**4**, A**5** and A**8** respectively are 128, 124, 124 and 124; the second voltage signals for the sub-pixels A**2**, A**3**, A**6** and A**7** respectively are 56, 56, 60 and 56. In a second frame, the first voltage signals for the sub-pixels A**1**, A**4**, A**5** and A**8** respectively are 124, 124, 128 and 124; and the second voltage signals for the sub-pixels A**2**, A**3**, A**6** and A**7** respectively are 60, 56, 56 and 56. In a third frame, the first voltage signals for the sub-pixels A**1**, A**4**, A**5** and A**8** respectively are 124, 128, 124 and 124; and the second voltage signals for the sub-pixels A**2**, A**3**, A**6** and A**7** respectively are 56, 56, 56 and 60. In a fourth frame, the first voltage signals for the sub-pixels A**1**, A**4**, A**5** and A**8** respectively are 124, 124, 124 and 128; and the second voltage signals for the sub-pixels A**2**, A**3**, A**6** and A**7** respectively are 56, 60, 56 and 56. In a fifth frame, the second voltage signals for the sub-pixels A**1**, A**4**, A**5** and A**8** respectively are 56, 56, 60 and 56; and the first voltage

signals for the sub-pixels A2, A3, A6 and A7 respectively are 128, 124, 124 and 124. In a sixth frame, the second voltage signals for the sub-pixels A1, A4, A5 and A8 respectively are 60, 56, 56 and 56; and the first voltage signals for the sub-pixels A2, A3, A6 and A7 respectively are 124, 124, 128 and 124. In a seventh frame, the second voltage signals for the sub-pixels A1, A4, A5 and A8 respectively are 56, 56, 56 and 60; and the first voltage signals for the sub-pixels A2, A3, A6 and A7 respectively are 124, 128, 124 and 124. In an eighth frame, the second voltage signals for the sub-pixels A1, A4, A5 and A8 respectively are 56, 60, 56 and 56; and the first voltage signals for the sub-pixels A2, A3, A6 and A7 respectively are 124, 124, 124 and 128.

In one aspect, in the first frame, an average signal of the first voltage signals for the sub-pixels A1, A4, A5 and A8 is:

$$\frac{128 + 124 + 124 + 124}{4} = 125.$$

Moreover, in each of the second frame, the third frame and the fourth frame, the average signal of the first voltage signals for the sub-pixels A1, A4, A5 and A8 also is 125; and each of the fifth frame, the sixth frame, the seventh frame and the eighth frame, the average signal of the first voltage signals for the sub-pixels A2, A3, A6 and A7 also is 125. That is, in the display of the eight frames of images, the average signals of all the first voltage signals of the respective frames of images are the same.

In another aspect, in the first frame, an average signal of the second voltage signals for the sub-pixels A2, A3, A6 and A7 is:

$$\frac{56 + 56 + 60 + 56}{4} = 57.$$

Moreover, in each of the second frame, the third frame and the fourth frame, the average signal of the second voltage signals for the sub-pixels A2, A3, A6 and A7 also is 57; and each of the fifth frame, the sixth frame, the seventh frame and the eighth frame, the average signal of the second voltage signals for the sub-pixels A1, A4, A5 and A8 also is 57. That is, in the display of the eight frames of images, the average signals of all the second voltage signals of the respective frames of images are the same.

Therefore, in spatial aspect (i.e., in each frame), the average signal of the first voltage signals (high voltage signals) for all sub-pixels is 125, and the average signal of the second voltage signals (low voltage signals) for all sub-pixels is 57. In particular, as listed in the following table 1.

TABLE 1

Voltage signal	First frame	Second frame	Third frame	Fourth frame	Fifth frame	Sixth frame	Seventh frame	Eighth frame
	Frame No							
Average signal of first voltage signals	125	125	125	125	125	125	125	125
Average signal of second voltage signals	57	57	57	57	57	57	57	57

In addition, in one hand, as shown in FIG. 5, in the preceding four frames, an average signal of the first voltage signals for the sub-pixel A1 is:

$$\frac{128 + 124 + 124 + 124}{4} = 125.$$

Likewise, the average signal of the first voltage signals for each of the sub-pixels A4, A5 and A8 also is 125 and thus is the same as the average signal of the first voltage signals for the sub-pixel A1.

Moreover, in the succeeding four frames, an average signal of the second voltage signals for each of the sub-pixels A1, A4, A5 and A8 is:

$$\frac{56 + 60 + 56 + 56}{4} = 57.$$

Therefore, in the display of eight frames of images, the average signal of voltages for each of the sub-pixels A1, A4, A5 and A8 is the average of 125 and 57.

In other hand, in the preceding four frames, an average signal of the second voltage signals for each of the sub-pixels A2, A3, A6 and A7 is that:

$$\frac{56 + 60 + 56 + 56}{4} = 57.$$

Likewise, in the succeeding four frames, the average signal of the first voltage signals for each of the sub-pixels A2, A3, A6 and A7 is:

$$\frac{128 + 124 + 124 + 124}{4} = 125.$$

Therefore, in the display of eight frames of images, the average signal of voltages for each of the sub-pixels A2, A3, A6 and A7 is the average of 125 and 57.

Sum up, in temporal aspect (i.e., in the eight frames), the displayed average signals for the respective sub-pixels (A1, A2, A3, A4, A5, A6, A7 and A8) all are the average of 125 and 57. In detail, as listed in the following table 2:

TABLE 2

Sub-pixel	1st frame	2nd frame	3rd frame	14th frame	Average signal	5th frame	6th frame	7th frame	8th frame	Average signal
A1	128	124	124	124	125	56	60	56	56	57
A2	56	60	56	56	125	128	124	124	124	57
A3	56	56	56	60	125	124	124	128	124	57
A4	124	124	128	124	125	56	56	56	60	57
A5	124	128	124	124	125	60	56	56	56	57
A6	60	56	56	56	175	124	128	124	124	57
A7	56	56	60	56	125	124	124	124	128	57
A8	124	124	124	128	125	56	56	60	56	57

In addition, as shown in FIG. **6**, in the figure, G**1**-**56** represents a voltage signal for the sub-pixel G**1** is 56, G**2**-**128** represents a voltage signal for the sub-pixel G**2** is 128. That is, the sub-pixel G**1** represents the green sub-pixel (G**1**) of the first pixel unit **110** in FIG. **4** and uses the second voltage signal (low voltage signal) to be driven, and the sub-pixel G**2** represents the green sub-pixel (G**2**) of the second pixel unit **120** in FIG. **4** and uses the first voltage signal (high voltage signal) to be driven. According to the above naming rule, it can be found that the sup-pixels G**1**, G**2**, G**3**, G**4**, G**5**, G**6**, G**7** and G**8** have the same color and all are green sub-pixels. Furthermore, the sub-pixels G**1**, G**4**, G**5** and G**8** respectively belong to the first pixel units **110** of different pixel groups and use the second voltage signals (low voltage signals) to be driven; and the sub-pixels G**2**, G**3**, G**6** and G**7** respectively belong to the second pixel units **120** of different pixel groups and use the first voltage signals (high voltage signals) to be driven.

Based on the description associated with FIG. **5**, it can be rightly found that for the green sub-pixels (G**1**, G**2**, G**3**, G**4**, G**5**, G**6**, G**7** and G**8**) in FIG. **6**, an average signal of the first voltage signals (high voltage signals) in spatial aspect (i.e., each frame) is 125, and an average signal of the second voltage signals (low voltage signals) in spatial aspect is 57; and in temporal aspect (i.e., for eight frames), the displayed average signal for each of the green sub-pixels (G**1**, G**2**, G**3**, G**4**, G**5**, G**6**, G**7** and G**8**) is the average of 125 and 57.

In the above embodiments, by adjusting distributions of high voltage signals and low voltage signals in spatial and temporal aspects, it can realize equivalent high voltage signals (average signals) in spatial and temporal being 125 and equivalent low voltage signals (average signals) in spatial and temporal being 57 for red sub-pixels (R), blue sub-pixels (B) and green sub-pixels (G) in the picture, and thus can ensure that the low frequency brightness flicker is not easily perceived.

It should be understood that, by adjusting distributions of first voltage signals and second voltage signals in spatial and temporal aspects, it also can achieve a picture display effect of high voltage signal being 126 and low voltage signal being 58, and a picture display effect of high voltage signal being 127 and low voltage signal being 59, please refer to FIG. **7** and FIG. **8** for details.

In addition, when the first voltage signal and the second voltage signal are kept unchanged in spatial and temporal (i.e., in each frame of image and in the multiple frames of images, the first voltage signal and the second voltage signal are kept unchanged), it can achieve display effects such as a combination of high voltage signal being 124 and low voltage signal being 56, or a combination of high voltage signal being 128 and low voltage signal being 60, please refer to FIG. **9** and FIG. **10** for details.

In addition, an embodiment of the disclosure provides a display apparatus. As shown in FIG. **11**, the display apparatus includes:

a display panel **10**, wherein the display panel is divided into multiple pixel groups **100**, each pixel group **100** includes a first pixel unit **110** and a second pixel unit **120** adjacent to each other, and each pixel unit includes a first sub-pixel R, a second sub-pixel G and a third sub-pixel B arranged in sequence;

a driving module (also referred to as driving circuit) **20**, configured to make each picture be displayed by sequential multiple frames of images and divide the multiple frames of images into two groups respectively as a first frame unit and a second frame unit with equal numbers of frames of images, and further configured to obtain a first voltage signal and a second voltage signal for each pixel group **100** in each frame of image and adjust the first voltage signal and the second voltage signal, to make average signals of all the first voltage signals for the multiple frames of images respectively be the same, average signals of all the second voltage signals for the multiple frames of images respectively be the same, average signals of the first voltage signals in the multiple frames of images for different pixel groups **100** respectively be the same, and average signals of the second voltage signals in the multiple frames of images for different pixel groups **100** respectively be the same. Wherein the first voltage signal drives the first sub-pixel R and the third sub-pixel B of the first pixel unit **110** as well as the second sub-pixel G of the second pixel unit **120**, the second voltage signal drives the first sub-pixel R and the third sub-pixel B of the second pixel unit **120** as well as the second sub-pixel G of the first pixel unit **110**, and the first voltage signal is not equal to the second voltage signal.

In an exemplary embodiment, in the above display panel **10**, for adjacent two pixel groups, the first pixel unit of one pixel group and the second pixel unit of the other one pixel group are adjacently disposed.

In an embodiment, the adjacent two pixel groups are two pixel groups adjacent to each other in a row direction or in a column direction.

In an exemplary embodiment, as shown in FIG. **12**, the figure is a flow chart of a driving method of a display panel. When a display period of one picture is an eight-frame period, and the first voltage signal is higher than the second voltage signal, steps of the method includes the following content.

Step S**100'**: dividing pixels into multiple pixel groups, each pixel group including a first pixel unit and a second pixel unit adjacent to each other, and each pixel unit including a first sub-pixel, a second sub-pixel and a third sub-pixel sequentially arranged in an order.

Step S**200'**: displaying each picture by sequential eight frames of images and dividing the eight frames of images

into two groups respectively as a first frame unit and a second frame unit with equal numbers of frames.

In particular, the first frame unit and the second frame unit each include four frames of images; the four frames of images in the first frame unit is adjacent to the four frames of images in the second frame unit, or the four frames of images in the first frame unit and the four frames of images in the second frame unit are arbitrarily arranged in timing sequence. That is, display orders of the eight frames of images are arbitrary.

Step S**300'**: obtaining a first voltage signal and a second voltage signal of each pixel group in each frame of image. In the first frame unit, the first voltage signal drives the first sub-pixel and the third sub-pixel of the first pixel unit as well as the second sub-pixel of the second pixel unit, the second voltage signal drives the second sub-pixel of the first pixel unit as well as the first sub-pixel and the third sub-pixel of the second pixel unit. In the second frame unit, the first voltage signal drives the second sub-pixel of the first pixel unit as well as the first sub-pixel and the third sub-pixel of the second pixel unit, the second voltage-signal drives the first sub-pixel and the third sub-pixel of the first pixel unit as well as the second sub-pixel of the second pixel unit. The first voltage signal is higher than the second voltage signal.

Step S**400'**: adjusting the first voltage signal and the second voltage signal and thereby making average signals of all the first voltage signals of multiple frames of images respectively be the same, average signals of all the second voltage signals of multiple frames of images respectively be the same, average signals of the first voltage signals in the eight frames of images for different pixel groups respectively be the same, and average signals of the second voltage signals in the eight frames of images for different pixel groups respectively be the same.

In an embodiment, the first voltage signal is a higher voltage signal with respect to the second voltage signal, and correspondingly the second voltage signal is a low voltage signal. In addition, the first voltage signal and the second voltage signal respectively have different voltage signal values, and these voltage signal values represent luminance signals displayed by sub-pixels. The above embodiment adjusts luminance signals of the sub-pixels in each frame as well as eight-frame period, so that average luminance signals in each frame (in spatial) as well as eight-frame period (in temporal) of luminance signals of respective sub-pixels are correspondingly consistent.

The above display apparatus uses a high and low voltages pixel driving manner of multi-frame period, so that the average signals of all the high voltage signals of the respective frames of images are the same, the average signals of all the low voltage signals of the respective frames of images are the same, the average signals of the high voltage signals in the multiple frames of images for different pixel groups respectively are the same, and the average signals of the low voltage signals in the multiple frames of images for different pixel groups respectively are the same. Therefore, the driving method not only solve the problem of low frequency brightness flicker, but also improves the problem of color shift in timings of sub-pixels in the same pixel unit, and thus display quality of the display panel is improved consequently.

The technical features of the above mentioned embodiments can be combined arbitrarily, and for the sake of brevity, not all possible combinations of the technical features in the above embodiments are described, however, as long as there is no conflict in a combination of these technical features, it should be considered as the scope of the description.

The above mentioned embodiments merely present several embodiments of the disclosure, which are described in more specific and in detail, but should not be interpreted as limiting the scope of the disclosure. It should be noted that one skilled in the art may make various modifications and improvements without departing from the concept of the disclosure, all of which should be included in the protection scope of the disclosure. Therefore, the protection scope of the patent application shall be subjected to the appended claims.

What is claimed is:

1. A driving method of a display panel, comprising:

dividing pixels into a plurality of pixel groups, wherein each of the pixel groups comprises a first pixel unit and a second pixel unit adjacent to each other, each of the first and second pixel units comprises a first sub-pixel, a second sub-pixel and a third sub-pixel sequentially arranged in an order;

displaying each picture by using sequential multiple frames of images and dividing the multiple frames of images into two groups respectively as a first frame unit and a second frame unit with equal numbers of frames of images;

obtaining a first voltage signal and a second voltage signal of each of the pixel groups in each of the multiple frames of images; wherein in the first frame unit, the first voltage signal drives the first sub-pixel and the third sub-pixel of the first pixel unit and the second sub-pixel of the second pixel unit, and the second voltage signal drives the second sub-pixel of the first pixel unit and the first sub-pixel and the third sub-pixel of the second pixel unit; wherein in the second frame unit, the first voltage signal drives the second sub-pixel of the first pixel unit and the first sub-pixel and the third sub-pixel of the second pixel unit, and the second voltage signal drives the first sub-pixel and the third sub-pixel of the first pixel unit and the second sub-pixel of the second pixel unit; and wherein and the first voltage signal is not equal to the second voltage signal;

adjusting the first voltage signal and the second voltage signal to make average signals of all the first voltage signals of the multiple frames of images respectively be the same, average signals of all the second voltage signals of the multiple frames of images respectively be the same, average signals of the first voltage signals in the multiple frames of images of different ones of the pixel groups respectively be the same, and average signals of the second voltage signals in the multiple frames of images of different ones of the pixel groups respectively be the same.

2. The driving method of a display panel according to claim **1**, wherein the first pixel unit and the second pixel unit in a same row are adjacently disposed.

3. The driving method of a display panel according to claim **2**, wherein in the same row, in the same row, for adjacent two of the pixel groups, the first pixel unit of one pixel group is disposed adjacent to the second pixel unit of the other one pixel group.

4. The driving method of a display panel according to claim **1**, wherein the first pixel unit and the second pixel unit in a same column are adjacently disposed.

5. The driving method of a display panel according to claim **4**, wherein in the same column, for adjacent two of the

pixel groups, the first pixel unit of one pixel group is disposed adjacent to the second pixel unit of the other one pixel group.

6. The driving method of a display panel according to claim **1**, wherein the multiple frames of images are eight frames of images.

7. The driving method of a display panel according to claim **6**, wherein the eight frames of images sequentially are a first frame of image, a second frame of image, a third frame of image, a fourth frame of image, a fifth frame of image, a sixth frame of image, a seventh frame of image and an eighth frame of image.

8. The driving method of a display panel according to claim **1**, wherein each of the first and second pixel units comprises three color sub-pixels.

9. The driving method of a display panel according to claim **8**, wherein the three color sub-pixels respectively are a red sub-pixel, a green sub-pixel and a blue sub-pixel.

10. The driving method of a display panel according to claim **1**, wherein the first sub-pixel, the second sub-pixel and the third sub-pixel respectively are a red sub-pixel, a green sub-pixel and a blue sub-pixel.

11. The driving method of a display panel according to claim **1**, wherein driving voltage polarities for adjacent sub-pixels are opposite to each other.

12. The driving method of a display panel according to claim **1**, wherein the first voltage signal and the second voltage signal respectively are corresponding to different signal values.

13. The driving method of a display panel according to claim **12**, wherein the signal values corresponding to the first voltage signal are 124 and 128, and the signal values corresponding to the second voltage signal are 56 and 60.

14. The driving method of a display panel according to claim **13**, wherein the sub-pixels driven by the first voltage signal and the second voltage signal have different signal values.

15. The driving method of a display panel according to claim **1**, wherein the first voltage signal is higher than the second voltage signal.

16. The driving method of a display panel according to claim **15**, wherein the first voltage signal and the second voltage signal alternately drive each sub-pixel.

17. A display apparatus comprising:

a display panel, wherein the display panel is divided into a plurality of pixel groups, each of the pixel groups comprises a first pixel unit and a second pixel unit adjacent to each other, and each of the first and second pixel units comprises a first sub-pixel, a second sub-pixel and a third sub-pixel sequentially arranged in an order;

a driving module, configured to display each picture by using sequential multiple frames of images and divide the multiple frames of images into two groups respectively as a first frame unit and a second frame unit with equal numbers of frames of images, and further configured to obtain a first voltage signal and a second voltage signal of each of the pixel groups in each of the multiple frames of images and adjust the first voltage signal and the second voltage signal to make average signals of all the first voltage signals of the multiple frames of images respectively be the same, average signals of all the second voltage signals of the multiple frames of images respectively be the same, average signals of the first voltage signals in the multiple frames of images of different pixel groups respectively be the same, and average signals of the second voltage signals in the multiple frames of images of different pixel groups respectively be the same; wherein in the first frame unit, the first voltage signal is configured to drive the first sub-pixel and the third sub-pixel of the first pixel unit and the second sub-pixel of the second pixel unit, and the second voltage signal is configured to drive the second sub-pixel of the first pixel unit and the first sub-pixel and the third sub-pixel of the second pixel unit; wherein in the second frame unit, the first voltage signal is configured to drive the second sub-pixel of the first pixel unit and the first sub-pixel and the third sub-pixel of the second pixel unit, and the second voltage signal is configured to drive the first sub-pixel and the third sub-pixel of the first pixel unit and the second sub-pixel of the second pixel unit; and wherein the first voltage signal is not equal to the second voltage signal.

18. The display apparatus according to claim **17**, wherein in the display panel, for adjacent two pixel groups, the first pixel unit of one pixel group is disposed adjacent to the second pixel unit of the other one pixel group.

19. The display apparatus according to claim **18**, wherein the adjacent two pixel groups are two pixel groups adjacent to each other in a row direction or in a column direction.

20. A driving method of a display panel, comprising:

dividing pixels into a plurality of pixel groups, wherein each of the pixel groups comprises a first pixel unit and a second pixel unit adjacent to each other, each the pixel unit comprises a first sub-pixel, a second sub-pixel and a third sub-pixel sequentially arranged in an order;

displaying each picture by using sequential eight frames of images and dividing the eight frames of images into two groups respectively as a first frame unit and a second frame unit with equal numbers of frames of images;

obtaining a first voltage signal and a second voltage signal of each of the pixel groups in each of the multiple frames of images; wherein in the first frame unit, the first voltage signal drives the first sub-pixel and the third sub-pixel of the first pixel unit and the second sub-pixel of the second pixel unit, and the second voltage signal drives the second sub-pixel of the first pixel unit and the first sub-pixel and the third sub-pixel of the second pixel unit; wherein in the second frame unit, the first voltage signal drives the second sub-pixel of the first pixel unit and the first sub-pixel and the third sub-pixel of the second pixel unit, and the second voltage signal drives the first sub-pixel and the third sub-pixel of the first pixel unit and the second sub-pixel of the second pixel unit; and wherein and the first voltage signal is higher than the second voltage signal;

adjusting the first voltage signal and the second voltage signal to make average signals of all the first voltage signals of the eight frames of images respectively be the same, average signals of all the second voltage signals of the eight frames of images respectively be the same, average signals of the first voltage signals in the eight frames of images of different ones of the pixel groups respectively be the same, and average signals of the second voltage signals in the eight frames of images of different ones of the pixel groups respectively be the same.

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